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09/282,619	03/31/1999	QUAN G. CUNG	AT9-99-037	8855

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EXAMINER	
DAY, HERNG-DER	
ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/282,619	Applicant(s) CUNG ET AL.
	Examiner Herng-der Day	Art Unit 2123

WJ

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 1999*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Abstract

1. The abstract of the disclosure is objected to because it exceeds 150 words in length. Correction is required. See MPEP § 608.01(b).

Specification

2. The disclosure is objected to because of the following informalities: to be consistent with the drawings, the following changes are necessary: (a) the graphics adapter **116** in line 14 of page 7 should be **118;** (b) the target group **204** in line 7 of page 10 should be **210**.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claims 1- 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3.1 Regarding claims 1, 14, and 21, the claims refer to "samples having a desired attribute". This is vague and indefinite and different from the detailed description of the preferred embodiment. For example, at page 9 lines 7-9, samples are categorized based on having the desired attribute <u>value</u> or <u>values</u>. (Emphasis added.) For the purpose of claim examination, the Examiner will presume that claims 1, 14, and 21 refer to "samples having a desired attribute <u>value</u>".

3.2 Regarding claim 9, the claim refers to "samples having at least one desired attribute". This is vague and indefinite and for the same reason as explained in **3.1**, the Examiner will presume that claim 9 refers to "samples having at least one desired attribute value".

3.3 Regarding claims 13 and 25, the claims refer to "a first group of samples". It is vague and indefinite what the first group is and how the first group is formed. At page 9 lines 7-9, samples having the desired attribute value or values are categorized in target group. For the purpose of claim examination, the Examiner will presume that claims 13 and 25 refer to "a target group of samples having the desired attribute value(s)".

3.4 Regarding claim 20, the claim refers to "a first subset of the plurality of samples". It is vague and indefinite what the first subset is and how the first subset is formed. At page 9 lines 7-9, samples having the desired attribute value or values are categorized in target group. For the purpose of claim examination, the Examiner will presume that claim 20 refers to "a target subset of the plurality of samples having the desired attribute value(s)".

3.5 Claims not specifically rejected above are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 101

4. The following is a quotation of 35 U.S.C. 101:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 21-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

5.1 Regarding independent claims 21 and 25, each claim preamble recites "A computer program product within a computer usable medium for selecting attributes for computing a model", but neither the preamble nor the limitations include a positive recitation that the computer program product when executed causes a computer to perform the steps recited in the limitations. As written, the claimed computer program product appears to consist of functional descriptive material; see MPEP Section 2106, subsection IV.B.1 (a).

5.2 Claims 22-24 are dependent on claim 21 and are rejected using the same analysis.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1- 25, are rejected under 35 U.S.C. 103(a) as being unpatentable over Piatetsky-Shapiro, "Discovery, Analysis, and Presentation of Strong Rules", in "Knowledge Discovery in Database", AAAI/MIT Press, 1991, in view of Simoudis et al., U.S. Patent No. 5,692,107 issued on November 25, 1997, and further in view of Dash et al., "Dimensionality Reduction of Unsupervised Data", Proceedings, Ninth IEEE International Conference on Tools with Artificial Intelligence, Nov. 1997.

7.1 Regarding claims 1-8, Piatetsky-Shapiro teaches comparing attribute values for samples having a desired attribute value to attribute values for all samples (claim 1). See section

13.5, KID3 Algorithm. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a target data set constructed from a plurality of data sources (claim 7), see col. 2, line 5 through line 26, and teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set (claim 2). The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results (claim8). See col. 4, line 42 through line 57. However, Simoudis et al. does not teach the selection of a subset of available attribute based on entropy measure.

Dash et al. teaches an entropy measure (claim 3) for determining the relative importance of variables; see section 2. Dash et al. also discloses a simple way to decide how many variables should be kept for a task by choosing the first d variables if it is known that an application only needs d variables (claim 4). See section 3. Thus the user gains insight into the data after the important original features are known.

In order to generate a predictive model for data having a desired attribute value one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for samples having a desired attribute value to attribute values for all samples (claim 1). Then to determine the statistical difference in a scientific and more efficient way one of ordinary skill in the art would be motivated by Dash et al. to apply an entropy measure (claim 3) to the above-mentioned data sets (claim 2) for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. By running statistical modules (claim 2) suggested by Simoudis et al. with module-

specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) (claim 1) by, for example, a number n (claim 4), a predetermined percentage (claim 5), or values exceeding a predetermined amount (claim 6), depending on requirements and extract a predictive model (claim 8) with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the entropy measure of Dash et al. to the statistical module of Simoudis et al. and perform data mining to samples having a desired attribute value and all samples, then select attribute(s) to compute a model, because of the resulting efficiency and flexibility.

7.2 Regarding claims 9-12, Piatetsky-Shapiro teaches that the KID3 algorithm is extensible even to handle multifield conditions, such as, A1=a1 & A2=a2, in comparing attribute values for samples having at least one desired attribute value to attribute values for all samples (claim 9). See section 13.5. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a target data set constructed from a plurality of data sources (claim 9), see col. 2, line 5 through line 26, and teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set. The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results (claim 9). See col. 4, line 42 through line 57.

In order to generate a predictive model for data having at least one desired attribute value one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for samples having at least one desired attribute value to attribute values for all samples (claim 9). Then to determine a largest difference between two data sets in a scientific and more efficient way one of ordinary skill in the art would be motivated by Simoudis et al. to run statistical modules to the above-mentioned data sets for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. After running statistical modules with module-specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) (claim 9) by, for example, a predetermined number (claim 10), a predetermined percentage (claim 11), or values exceeding a predetermined amount (claim 12), depending on having a largest difference between the above-mentioned data sets and compute a predictive model (claim 9) with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the statistical module suggested by Simoudis et al. and perform data mining to samples having at least one desired attribute value and all samples, then select attribute(s) to compute a model, because of the resulting efficiency and flexibility.

7.3 Regarding claims 13 and 25, Piatetsky-Shapiro teaches that the KID3 algorithm is extensible even to handle multifield conditions, such as, A1=a1 & A2=a2, in comparing attribute values for a target group of samples having the desired attribute value(s) to attribute values for all samples. See section 13.5. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a target data set constructed from a plurality of data sources, see col. 2, line 5 through line 26, and teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set. The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results. See col. 4, line 42 through line 57.

In order to generate a predictive model for a target group of samples having the desired attribute value(s) one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for a target group of samples having the desired attribute value(s) to attribute values for all samples. Then to determine a difference between two data sets in a scientific and more efficient way one of ordinary skill in the art would be motivated by Simoudis et al. to run statistical modules to the above-mentioned data sets for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. After running statistical modules with module-specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) depending on having a largest difference between the above-mentioned data sets and compute a predictive model with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the statistical module suggested by Simoudis et al. and perform data mining to: (a) a target group of samples having the desired attribute value(s), and

(b) all samples, then select attribute(s) to compute a model, because of the resulting efficiency and flexibility

7.4 Regarding claims 14-19, Piatetsky-Shapiro teaches comparing attribute values for samples having a desired attribute value to attribute values for all samples (claim 14). See section 13.5, KID3 Algorithm. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a data mining system including a user interface, a target data set constructed from a plurality of data sources, and a server processor (claim 14), see col. 2, line 5 through line 26. Although Simoudis et al. does not mention a system memory, it is inherent for a processor with a system memory to execute a computer program. Simoudis et al. also teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set (claim 15). The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results (claim 14). See col. 4, line 42 through line 57. However, Simoudis et al. does not teach the selection of a subset of available attribute based on entropy measure.

Dash et al. teaches an entropy measure (claim 16) for determining the relative importance of variables; see section 2. Dash et al. also discloses a simple way to decide how many variables should be kept for a task by choosing the first d variables if it is known that an application only needs d variables (claim 17). See section 3. Thus the user gains insight into the data after the important original features are known.

In order to set up a system to generate a predictive model for data having a desired attribute value one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for samples having a desired attribute value to attribute values for all samples (claim 14). Then to determine the statistical difference in a scientific and more efficient way one of ordinary skill in the art would be motivated by Dash et al. to apply an entropy measure (claim 16) to the above-mentioned data sets (claim 15) for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. By setting up a system and running statistical modules (claim 15) suggested by Simoudis et al. with module-specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) (claim 14) by, for example, a predetermined number (claim 17), a predetermined percentage (claim 18), or values exceeding a predetermined amount (claim 19), depending on requirements and generate a predictive model (claim 14) with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set up a system and incorporate the entropy measure of Dash et al. to the statistical module of Simoudis et al. and perform data mining to samples having a desired attribute value and all samples, then select attribute(s) to compute a model, because of the resulting efficiency and flexibility.

7.5 Regarding claim 20, Piatetsky-Shapiro teaches that the KID3 algorithm is extensible even to handle multifield conditions, such as, A1=a1 & A2=a2, in comparing attribute values for a target subset of samples having the desired attribute value(s) to attribute values for

all samples. See section 13.5. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a data mining system including a user interface, a target data set constructed from a plurality of data sources, and a server processor, see col. 2, line 5 through line 26. Although Simoudis et al. does not mention a system memory, it is inherent for a processor with a system memory to execute a computer program. Simoudis et al. also teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set. The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results. See col. 4, line 42 through line 57.

In order to set up a system to generate a predictive model for a target subset of samples having the desired attribute value(s) one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for a target subset of samples having the desired attribute value(s) to attribute values for all samples. Then to determine a difference between two data sets in a scientific and more efficient way one of ordinary skill in the art would be motivated by Simoudis et al. to run statistical modules to the above-mentioned data sets for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. After running statistical modules with module-specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) depending on having a largest difference between the above-mentioned data sets and compute a predictive model with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set up a system, select the statistical module suggested by Simoudis et al., and perform data mining to: (a) a target subset of samples having the desired attribute value(s), and (b) all samples, then select model attribute(s) and compute a model because of the resulting efficiency and flexibility.

7.6 Regarding claims 21-24, Piatetsky-Shapiro teaches comparing attribute values for samples having a desired attribute value to attribute values for all samples (claim 21). See section 13.5, KID3 Algorithm. Therefore, full data set can be estimated by sample-derived rules. However, Piatetsky-Shapiro does not teach the selection of a subset of available attributes.

Simoudis et al. discloses a target data set constructed from a plurality of data sources (claim 21), see col. 2, line 5 through line 26, and teaches the selection of a data analysis module, for example, a statistical module, to perform data mining to the selected data set (claim 22). The user sets module-specific parameters. Once the user determined that the mining results are satisfactory based on the user's queries or hypotheses, a predictive model is extracted based on such results. See col. 4, line 42 through line 57. However, Simoudis et al. does not teach the selection of a subset of available attribute based on entropy measure.

Dash et al. teaches an entropy measure (claim 23) for determining the relative importance of variables; see section 2. Dash et al. also discloses a simple way to decide how many variables should be kept for a task by choosing the first d variables if it is known that an application only needs d variables (claim 24). See section 3. Thus the user gains insight into the data after the important original features are known.

In order to generate a predictive model for data having a desired attribute value one of ordinary skill in the art would first be motivated by Piatetsky-Shapiro to compare attribute values for samples having a desired attribute value to attribute values for all samples (claim 21). Then to determine the statistical difference in a scientific and more efficient way one of ordinary skill in the art would be motivated by Dash et al. to apply an entropy measure (claim 23) to the above-mentioned data sets (claim 22 and 23) for data mining. Data mining allows a user to conduct a relatively broad search of large databases for relevant information that may not be explicitly stored in the databases. By running statistical modules (claim 22 and 23) suggested by Simoudis et al. with module-specific parameters set by the user, for example, number of attributes selected, one of ordinary skill in the art may systematically select the required attribute(s) (claim 21) by, for example, a number n (claim 24), depending on having a largest difference between the above-mentioned data sets and compute a predictive model with more flexibility.

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the entropy measure of Dash et al. to the statistical module of Simoudis et al. and perform data mining to samples having a desired attribute value and all samples, then select attribute(s) to compute a model, because of the resulting efficiency and flexibility.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference to Agrawal et al. "Mining Association Rules between Sets of Items in Large Databases", Proceedings of the 1993 ACM SIGMOD International Conference on

Management of Data, June 1993, Volume 22, Issue 2, is cited as teaching an efficient algorithm that generates all significant association rules between items in the database.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Herng-der Day whose telephone number is (703) 305-5269. The examiner can normally be reached on 8:30 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J Teska can be reached on (703) 305-9704. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Herng-der Day
April 18, 2002

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER